



A Review of Psychological Stressors Towards Cognitive Recovery of Injured Athletes

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ABSTRACT

The information related to the effects of psychological stressors on the recovery of injured athletes is essential to discovering the problems the athletes face. The paper provides various information related to the impact of psychological stressors on the recovery of injured athletes from global publications. There are a total of 30 articles have been reviewed and summarized. There are also 50 references used to support the effects of psychological stressors on the recovery of injured athletes. The purpose of providing information related to psychological stressors' impact on recovering injured papers is to show how athletes change their lives after recovering from the injuries and the effects of injuries. Many types of research conducted in the past have shown different research outcomes to measure the life of the athletes after recovering from the injury. Some studies showed that athletes continue to join the sports after being injured. Some research showed athletes stopped joining sports or changed their lifestyles after recovering from the injury. The stressors caused by the injury may result in fear and anxiety among most athletes. The psychological stressor symptoms will be discussed and reviewed in the paper to other research outcomes. At the end of the article, a common finding about psychological stressors toward the cognitive recovery of injured athletes will be shown. These common findings can reference other research on the same field of study.

1. Introduction

Any injured athletes will have the fear and worry on their health and movements after recovered from the injured. Depend on how serious the injured is. If the injure level is too seious, then the athletes cannot continue to join the sport. They may suffered from disability for their entire life. However, if the injured level is not serious, they may continue to join the sport but with minimum affords in the game. The recovery of the injure really gives stress to many athletes. The symptoms of the pschological stress are nervous, social life withdrawal, increase in caffeine, alcohol, tobacco or drug taken, changes in sleeping, changes is eating patterns, poor performance in the work, and poor performance in acadmic (Scott M Monroe & George Slavich, 2007), (Joshua Everhart, Kristie Harris, & Aaron Chafitz, 2020), (Rhonda Cohen, S.M. Nordin, & Earle Abrahamson, 2013), and (Cynthia Labella, 2013) . Some injured athletes could not accept the injury will committed suicide (Ashwin L Rao, Irfan M., & Jonathan A Drezne, 2015), (Eugene S Hong, 2015), (Matthew H. Leddy, Lambert Michael, & Benjamin M. Ogles, 1994), (Vibha Yadava & Purnima Awasthi, 2016), (Toomas Timpka, Armin Spreco, & Orjan Dahlstrom, 2020) and (Guoxiao Sun, Jingyi Zhao, & Siyu Tian, 2020). All the injuries happen during the sport time are accidents. Therefore, as an athlete, he or she has to proetct body from hurting accidentally.

2. Literature Review

2.1 Reviews of Psychological Stressors Toward the Recovery of Injured Athletes and the Types of Injuries

There was researches showing that sport injuries can change the psychological responses of the athletes (Robert Masten et al., 2014). It is depends on which parts of the body are having injured. The important parts in the body that cause psychological stressors when they injured are knee, ankle, fingers, eyes, ears, face, and arms. Similary, The parts in the body that do not cause psychological stressors when they injured is the skin (Andrea Quevedo-Prince, 2020). Most of the athletes play the sports always ignore the safety. This is the main reason that cause the injure and then cause the psychological stressors. The period of psychological stressors could be very long for the serious injured. Because of that, it is always changes the life of an athlete. Let examines some of the research outcomes related to the psychological stressors toward the recovery of injured athletes.

Reviews 1: Psychological Consequences of Athletic Injury Among High-Level Competitors (Matthew H. Leddy et al., 2010)

Many injury prohibit continue of playing the game in the sports. It was notice that most of the injures have a predictable emotional impact on athletes. However, the psychological impact of injury has not been well documented. The paper examines the psychological reactions to injury among 343 male collegiate athletes participating in 10 sports. All athletes were assessed using measures of depression, anxiety, and self-esteem during preseason physical examinations. Injured athletes along with matched controls were later assessed within one week of experiencing an athletic injury and 2 months later. A 4 x 3 (Injury Status x Time of Testing) repeated measures multivariate analysis of variance (DM MANOVA)

revealed that injured athletes exhibited greater depression and anxiety and lower self-esteem than controls immediately following physical injury and at follow-up 2 months later. The findings supported the general observation that physically injured athletes experience a period of emotional distress that in some cases may be severe enough to warrant clinical intervention.

Reviews 2: Psychosocial Factors in Sports Injury Rehabilitation and Return to Play (Leslie W. Podlog & John Heil, 2014)

In this article the principles and practices that guide psychological intervention with injury, and encourages a psychological approach to injury for clinicians is discussed. The article shows two parts. Part 1 reviews the research literature, and serves as a foundation for the review of clinical practices. Part 2 Examine the research literature highlights 4 areas that are (1) psychological factors influencing rehabilitation, (2) social factors affecting rehabilitation, (3) performance concerns among returning athletes, and (4) tools/inventories for assessing psychological readiness to return. A synopsis of an injury intervention plan is provided, and the influence of pain and fear in the rehabilitation process is described. A comprehensive perspective of injury should encompass emotional and cognitive factors as well as physical, functional abilities. The sports medicine professional plays a critical role in psychological assessment and intervention, especially when injury is severe or otherwise complicated.

Reviews 3: Consequences of Injury and Motivation to Return to Sports Among Athletes: a Review Literature (Joel M Jose , 2021)

The injury is very dynamic and can be happened to all the athletes. The injured athletes have to learn from the sport and accept the fact of injure. There is a need of sport psychologists to educating the injured athletes. The coach also plays an important role to develop the rehabilitation services for those injured athletes. Based on the research, the motivation and returning to sports from serious injury and its psychological outcomes are important factors that encourage injured athletes continue involves in the sports. The empirical data showed that there is a strong positive association between motivation and beneficial consequences. The studied were analyzed using correlation function to show the relationship between injury and motivation. There is a positive correlation relationship between injury and motivation. The injured athletes must go through the coaching, psychological training, and advices from the friends in order to recover from the stress and then motivate to continue join in the sport.

Reviews 4: Psyche Physiological Stress Recovery in Outdoor Nature-Based Interventions: A Systematic Review of the Past Eight Years of Research (Sus , Ulrik, Dorte , & Marien , 2019)

The research had discovered that natural environments is an important factor that can help to reduce the stress and recover from the stressor effects. The paper aims to provide reviews and synthesis of the past eight years researches related to psychological effects of outdoor that can helps reduce the stress. There were total of 5618 articles reviewed and summarized into the paper. The outcomes of the research showed that towards outdoor, stressor effects can be reduced 40% or more. The reduction of stress depends on the personal. The natural exposure can helps to control the emotional effects. The mood also can be adjusted through the natural exposure. For example, if a person have stresses, he or she can travel around the country or overseas. Within the travels, this may help the person to reduce the stress and perhaps the mood may be getting better. The psychologists had mentioned that, this natural environment exposures may not works for certain people. It has to depend how serious the stress is. A small stress can be cured using natural environment exposure. The research only limited for past eight years study. This perhaps is the limitation to the research.

Reviews 5: An Integrated Model of Response to Sport Injury: Psychological and Sociological Dynamics (D. Wiese-Bjornsta & Aynsley M. Smith, 1998)

The psychological and sociological dynamics have great response to the sport injury. From the integrated model, it can showed that the existing conceptual models depicts the dynamic process of psychological response to the sport injury. The integration model consists of personal and situational moderating factors as well as the cognitive and behavioral responses of the athletes in sport injury. The injury of any athletes in any sports will change their life styles of living and how the athletes face with the next challenges in the sport. Some athletes will face fear when they see the sports even the injury is a small case for them. Some athletes withdraw themselves from the sport games and never return it. These types of athletes most properly were facing serious injuries and becomes disable in their life. The injured athletes may need to face in new social life and learn how to overcome their next life. This is very challenging.

Reviews 6: Effectiveness of Psychological Intervention Following Sport Injury (Laura M. Schwab Reese , Ryan Pittsinger , & Jingzh, 2012)

The effectives of psychological intervention on injured athletes are imagery, goal setting, relaxation, and other common techniques during the post-injury rehabilitation period were studied to reduce the stressor effects. The guided imagery and relaxation were commonly used in psychological intervention. Other interventions used are goal-setting and micro counselling also used in psychology to reduce the stressor effects. The outcomes showed that Guided imagery/relaxation was shown to be associated with improved psychological coping and reduced re-injury anxiety. Goal setting, on the other hand was not directly associated with the reduction of negative psychological consequences. The micro counselling skills, acceptance and commitment therapy, and written disclosure have demonstrated effectiveness in reducing negative

psychological consequences, and thus improving psychological coping, and reducing re-injury anxiety. The findings suggested a significant need to develop and implement well-designed intervention studies that target improvement of post-injury psychological outcomes in order to assist injured athletes successfully recovery from sport injury.

Reviews 7: Influencing Factors of Athletes' Injury Rehabilitation from the Perspective of Internal Environment (Xiang Huang & Xiaoping Wang, 2021)

Athlete's injury recovery is related to the athlete's personal value. A scientific and effective rehabilitation program will help athletes overcome their illnesses and return to the game as soon as possible. Based on the literature review and the internal environment perspective, the research constructs a model of factors affecting athletes' injury rehabilitation. Through the empirical analysis of 129 questionnaires, we have verified the research hypothesis of each factor. The research results show that psychological adjustment, rehabilitation learning, and video reflection have a significant positive impact on athletes' injury rehabilitation, while imagery has no significant impact. The research provides a reference plan for athletes to adopt effective injury rehabilitation training methods. Figure 1 shows the proposed research framework.

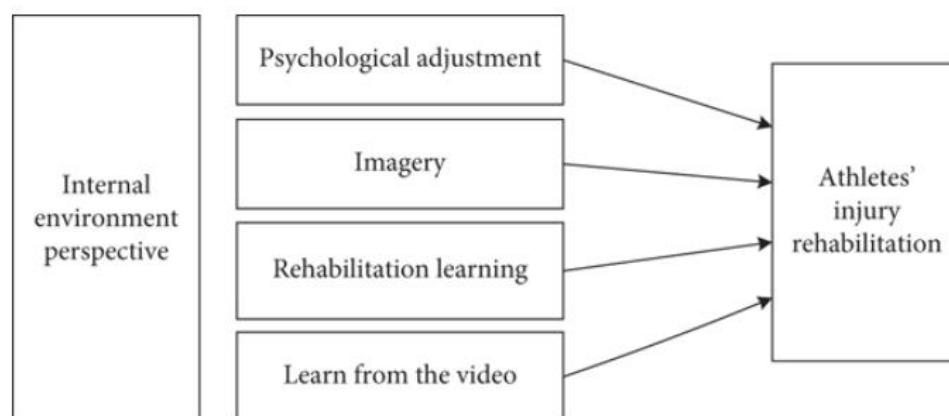


Figure: 1 The proposed research framework to study the factors influence on athletes' injury rehabilitation from the perspective of internal environment

Reviews 8: Psychological Aspects of Sport-Injury Rehabilitation: A Developmental Perspective (Maureen Weiss, 2003)

One of the sorely neglected areas in athletic-injury psychology is age-related differences in antecedents and consequences of injury. Most of the researchers to date have investigated injury factors in collegiate athletes or young adult recreational participants. It was known from developmental sport psychology that children, adolescents, and young, middle, and older adults differ in their self-perceptions, social influences, emotional responses, motivations, and self-regulation skills relative to physical activity and sport involvement. It was only reasonable to extrapolate, then, that such individual differences and social-environmental influences are also salient when considering factors related to athletic-injury rehabilitation.

The injury rehabilitation does not mean to the physical rehabilitation on the injured, but it is more to the psychological rehabilitation and reduces the stress of the athletes. In the study, the injured athletes not suffering from the physical pains, but also suffering from their remaining of their life. This is most important part. Example, when the racing car expert hit an accident and seriously injured to his leg, he will not worry about the pain of the leg, he is more worried whether his leg turns to become disabled or not. Because leg is important for him to walk, run, and move from one place to another place. If he lost the leg and have to use additional tools to guide him to walk, then to him at the beginning he will not accept. After sometimes and if advice from the psychologist, he may slowly accept the fact and change his remaining life style. The research has shown that it is possible to develop different levels of psychological injured rehabilitation according to the ages and gender. This can help to recover fast from different levels of injured in the athletes.

Reviews 9: Athletes' Use of Mental Skills During Sport Injury Rehabilitation (Monna Arvinen-Barrow, Damien Clement, & Jordan Uiley, 2015)

The objective of the research was to find out if any mental skills were used by athletes during injury rehabilitation, and by who taught the skills. The research also involved cross-cultural differences. From the research, it took 5 universities in the United States and a mixture of collegiate, professional, and recreational club athletes from the United Kingdom and Finland. The research used questionnaire to collect the data. The participants consist of 1283 athletes from the United States, United Kingdom, and Finland, who participated in diverse sports at varying competitive levels. The main activity involved in the research is a part of a larger study on athletes' expectations of injury rehabilitation, participants were asked a series of open-ended and closed-ended questions concerning their use of mental skills during injury rehabilitation. The outcomes of the research showed that over half (64.0%) of the samples reported previous experience with athletic training, while 27.0% indicated that they used mental skills during injury rehabilitation. The top 3 mental skills reported

were goalsetting, positive self-talk/positive thoughts, and imagery. Of those athletes that used mental skills, 71.6% indicated that they felt mental skills helped them to rehabilitate faster. A greater proportion of athletes from the United States (33.4%) reported that they used mental skills during rehabilitation compared with athletes from the United Kingdom (23.4%) and Finland (20.3%). A small portion (27.6%) of the participants indicated that their sports medicine professional had taught them how to use mental skills; only 3% were taught mental skills by a sport psychologist. The conclusion is, the low number of athletes who reported using mental skills during rehabilitation is discouraging, but not surprising given research findings that mental skills are underutilized by injured athletes in the 3 countries examined. More effort should be focused on educating and training athletes, coaches, and sports medicine professionals on the effectiveness of mental training in the injury rehabilitation context.

Reviews 10: Providing Social Support to Injured Athletes: Applications of the International Sport Coaching Framework (Stefanee Maurice, Clayton Kuklick, & Martha Anderson, 2017)

The society support for injury athletes are important to ensure the injured athletes recover fast and return to their normal life. The International Sport Coaching Framework (ISCF) is one of the examples of sport society where it is established to highlight how coaching knowledge can be integrated and (i.e., professional, interpersonal, intrapersonal) applied to offer athletes' social support in their injury rehabilitation process. There are researches suggests that injured athletes may be isolated from their coach and team, which contributes to negative emotions that significantly shape athletes' return to play. This isolation should not happen in reality because it really hurts the injured athletes in terms of their spirit. Research exploring to the social support provided by others where it excluding coaches, during the rehabilitation process has shown to mediate the effects of injury, yet little research had shown how coaching knowledge is used to provide social support to injured athletes. The research applies integrated coaching knowledge towards providing social support during injury rehabilitation process. Hypothetical injury scenarios are shared and analysed using the ISCF to show how the knowledge plays an important role provides the social support.

With the injury being a facet of sport which will seemingly never cease to exist, it is important for coaches to understand how to apply their knowledge to the specific context of injured athletes. The ISCF highlights three areas of knowledge (professional, interpersonal, and intrapersonal) that coaches need to be able to demonstrate to be seen as effective coaches. The types of knowledge highlighted in the ISCF that coaches possess connect with the three major type of social support. These connections were reinforced throughout the hypothetical scenarios and analyses, explicitly pointing out where coaches' specific knowledge types will be required to address the types of social support that should be provided in that situation to facilitate athlete recovery. In conclusion, if coaches are to be seen as effective in the context of injured athletes, knowledge in all areas of the ISCF should be applied. Future research should examine the integration of the ISCF knowledge types in the context of injured athletes using complexity theory rather than reductionist theoretical approaches, to provide a deeper understanding for the interactive role these knowledge type splay in providing social support [47]. The integration of ISCF as a framework to provide social support in the context of injured athletes also provides additional content and knowledge for coach educators to facilitate coaches' application of the highly-contextualized knowledge foundations into practice. Coaches will continue to deal with athletic injury as long as they are engaged in the profession and should be given the opportunity to learn how to best provide social support to their injured athletes and effectively utilize the ISCF knowledge components to improve athlete outcomes.

Reviews 11: Injured Athletes' Perceptions about Social Support (Damien Clement & Vanessa Shannon, 2011)

Referring to the hypothesis conducted in the research, social support moderates the harmful effects of stress and, in turn, indirectly affects injured athletes' health and well-being. Many researchers suggested that perceptions of social support influence athletes' psychological reactions, as well as their rehabilitation adherence, but additional research in this area is warranted. The objective to have this research is to examine injured athletes' perceptions regarding satisfaction, availability, and contribution for each of the 8 types of social support. The methodology applied is descriptive type of research where Mid-Atlantic Division II and III institutions were considered. There were 49 injured athletes participated in the research. The main parameters to be measured are social support was assessed using a modified version of the Social Support Survey. The research outcomes showed that injured athletes were significantly more satisfied with social support provided by athletic trainers (ATCs) than that provided by coaches and teammates. In addition, injured athletes reported that social support provided by ATCs contributed significantly more to their overall well-being. Athletes reported several significant differences regarding satisfaction and contribution to well-being among the 8 different types of social support. In conclusion injury, and the unavoidable part of sport, is often accompanied by negative psychological reactions. This reaction may have a negative influence on an athlete's experience of injury and rehabilitation. The findings in the research also suggest that perceptions of social support provided by ATCs have the greatest influence on injured athletes' rehabilitation and well-being.

Reviews 12: Social Support Patterns of Collegiate Athletes Before and After Injury (Jingzhen Yang, Corinne Peek-Asa, & John B Lowe, 2009)

One of the key to reduce the stressor effects after recover from the injury is the social support. The Social support has been identified as an important factor in facilitating recovery from injury. However, no previous authors have prospectively assessed the change in social support patterns before and after injury. The research proposed was to examine

the preinjury and post injury social support patterns among male and female collegiate athletes. The research employed prospective observational study to Big Ten Conference universities. There were total of 256 National Collegiate Athletic Association Division male and female collegiate athletes from aged 18 or older and from 13 sports teams patients and other other Participants involved in the research. The measure were the Injury incidence, which was identified using the Sports Injury Monitoring System. Social support was measured using the 6-item Social Support Questionnaire. Data on preinjury and post injury social support patterns were compared. The results showed that male athletes reported more sources of social support than female athletes, whereas female athletes had greater satisfaction with the support they received. Athletes' social support patterns changed after they became injured. The Injured athletes reported relying more on coaches ($P = .003$), athletic trainers ($P < .0001$), and physicians ($P = .003$) for social support after they became injured. Athletes also reported greater post injury satisfaction with social support received from friends ($P = .019$), coaches ($P = .001$), athletic trainers ($P = .0001$), and physicians ($P = .003$). Conclusions: Our findings identify an urgent need to better define the psychosocial needs of injured athletes and also strongly suggest that athletic trainers have a critical role in meeting these need.

Reviews 13: The Evolution of Psychological Response to Athlete Injury Models for Professional Sport (Billymo Rist, Tony Glynn, & Anthea C Clarke, 2020)

Elite competitive sport is linked with a unique collection of stressors distinct from the general population. While there have been advancements in understanding the role that stressors play within the elite sporting environment, uncertainty still exists around a clear process for measuring stressors, and their specific relationship to injury. A number of models have been proposed as useful frameworks for investigating and describing the role of stress and its interaction with the psychological response to athletic injury. While these models provide evolving points of view drawing on different theoretical backgrounds regarding their interpretation of athletic stress and injury, they offer little application to the applied elite sporting environment, and no detail of how they these models support athletes, and high performance staff in the applied setting. The narrative review will present two popular theoretical psychological models of sports injury rehabilitation. It is argued that these models could be better applied in the current sporting environment if they utilized biological markers such as cortisol measures of personality. Extending from the Biopsychosocial model of injury, the research has present an updated model of injury quantifying the psychophysiological response for athletes. The model proposed (See Figure 2) is aligned with the current applied sporting landscape, incorporating the implementation of measurement practice guidelines, and offering high-performance staff an example that can be applied to their unique setting by assessing individuals' distinct measures of cortisol and personality in response to stress and injury.

The overall results showed that the current models explaining the psychological process of injury rehabilitation, while theoretically sound, are limited in quantitative measures to support the psychological response to injury and focus heavily on stress management. Therefore, these models are reactionary in nature, only being implemented once the athlete is injured, rather than proactively predicting the internal and external determinants that may predispose athletes to psychological stress increasing risk of injury. The Athlete Prevention and Injury Response Model has been developed to provide a detailed protocol, that can be applied, to the individual athlete by quantifying their unique personality traits that may account for any predisposition that the athlete has towards stress.. Additionally, utilizing a model that combines psychological trait measures of personality, psychological state measures of stress and psychophysiological measures of stress, allows high performance staff to better understand and manage athletes stress within the applied sporting environment.

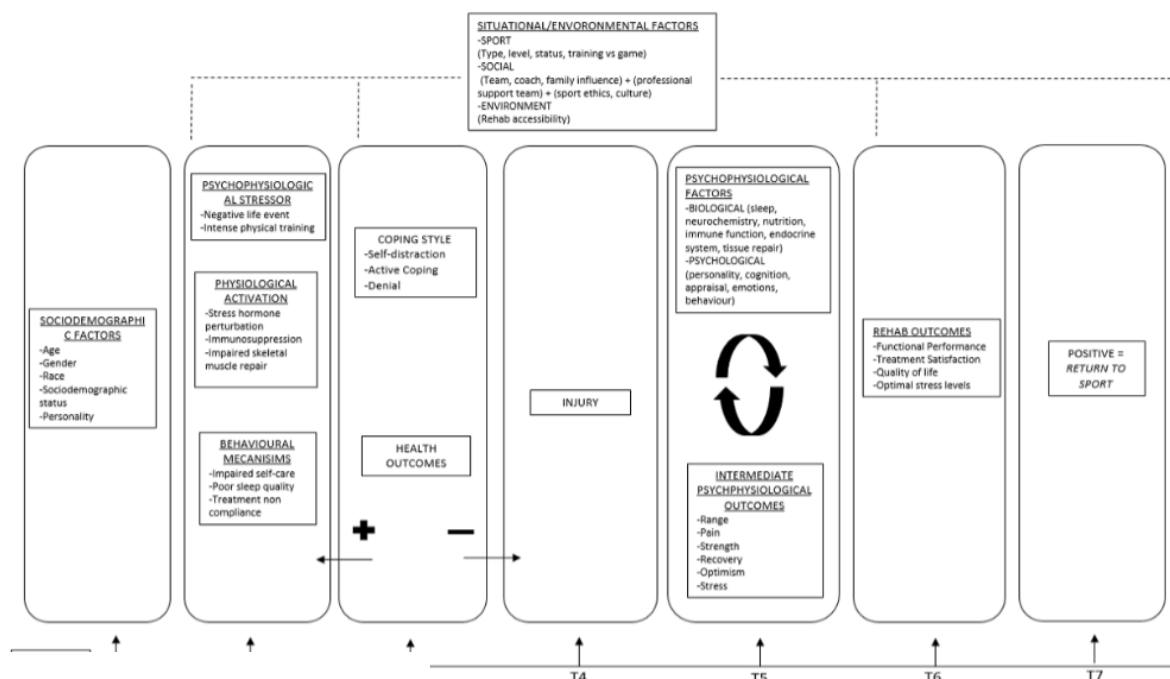


Figure: 2 The proposed model for Athlete Prevention and Injury Response. T1 represents the assessment of salivary cortisol, personality traits, and perceived stress levels. T2, T3, T4, T5, T6, T7 represent the assessment of salivary cortisol, and perceived stress levels. The plus symbol indicates positive health outcomes, the minus symbol indicates negative health outcomes, and the cyclic symbol indicates interaction between psychophysiological factors and intermediate psychophysiological outcomes.

Reviews 14: Correlations Between Emotion Regulation Behaviours and Processes of Accepting Sports Injuries: From the Perspective of Enacted Social Support (Tomonori Tatsumi & Takashi Takenouchi, 2017)

The research examined the relationships between emotion regulation behaviour(ERB) and athletic injury psychological acceptance (AIPA) process which consists of psychosocial recovery factor (PSRF) and AIPA, from the view point of enacted social support (SS). Athletes (N = 180) that had experienced an in-jury were divided into high-and low-SS groups based on SS scale. Next, a model, in which ERB variables have an influence on AIPA process, was examined using multiple-group structural equation modelling. The model indicated differences in the degree of SS. It was suggested that in the high-SS group, ERB of emotional expression and positive reappraisal were functional, and these ERB were positively mediated by PSRF of emotional stability and temporal perspective, respectively, which promoted AIPA. Whereas, it was suggested that ERB of emotional suppression and positive reappraisal were functional, and these ERB were positively mediated by temporal perspective, which promoted AIPA in the low-SS group. However, emotional suppression was also negatively mediated by emotional stability, which obstructed AIPA. These results are suggested that differences in athletes' support environment should be considered when designing interventions.

The results of a t-test did not indicate differences in the use of emotional suppression between the high and low SS groups. On the other hand, the high SS group used emotional expression and positive reappraisal more often than the low SS group. That is, though the level of recognition of provided SS did not directly affect the use of emotional suppression, it might have contributed to "reducing intention of suppression," which might have facilitated the use of emotional expression and positive reappraisal. Based on the results of multi group analysis, injured athletes with high recognition of enacted SS adopted ERB related to emotional expression and positive reappraisal more often than those with low recognition of SS. Moreover, utilized emotional expression and positive reappraisal are considered to have facilitated AIPA directly (positive reappraisal → AIPA) or indirectly (emotional expression → emotional stability → AIPA and positive reappraisal → time perspective → AIPA).

Reviews 15: A Review on Volleyball Injuries (Hans Eric Reitmayer, 2017)

Volleyball is a very exciting sport where the game involves highly usage of physical body of the human. The athletes play the volleyball will have body contact to each other. The teams being separated by the net. During the game, the injuries can happen at any time. Example of the injury is the lower limb injuries take place during spiking and blocking through unintentional and illegal intrusion of a player in the opponent's court. Due to the specificity of the game, the joints of the upper limbs are also subject to overload. The research conducted purposely wants to study and analyse the international literature on injury and trauma performance in volleyball sport. The methods of conduct the research is to study several injuries in performance volleyball, which were identified using online database such as Google Scholar, EBSCO, Springer, Elsevier, and Scopus. The results obtained are the injury pattern shows the ankle sprain as being by far the most common injury in volleyball with a percentage of 31.9%. The knee is the second most injured anatomic site, 17.38% of injuries affecting this joint. Third most frequent injury affects the fingers 13.44%, followed by lower back 12.38% and shoulder trauma 12.18%. The hand is injured by 6.97%, while other injuries were found in 5.25% of cases. In summary, there is a need for in depth analysis of volleyball injuries still persists. From the literature it is understood the mechanisms produce the injuries. It is no longer enough to recover from an injury, it must be prevented entirely if possible. Time spent by a player recovering may face the negative impact to the team's performance. Injury prevention measures must occupy an important place in training. Coaches should take into account.

Reviews 16: Epidemiology of Volleyball Related Injuries in the Young Athlete (Gerardo E Miranda, Manuel F Mas, & William Micheo, 2015)

The volleyball is also a worldwide sport played by approximately 200 million people. It is played at different levels of competition, and organizations, starting from youth to the professional level. Young athletes get involved early in club leagues and interscholastic competition. Volleyball is currently among the most popular club sports in the United States and Puerto Rico. In Puerto Rico, approximately 300 teams participated in the Youth Volleyball Federation Club tournaments throughout the island in 2010. Although the volleyball is famous sports, there were still many athletes faced on the problems of injuries. Among all the injuries, the joints, muscle-tendon units, and growth plates, and psychological stress all loads to the medical centre. The studies in the research had describing the volleyball related injuries in the limited population. Most evidence in the literature involves either college, professional or elite level athletes. The National Collegiate Athletic Association (NCAA) established an injury surveillance system (ISS) in which data was collected prospectively from 1988-2004 in multiple sports at the collegiate level, including women's volleyball. The British Journal of Sports Medicine published several abstracts from the International Volleyball Federation (FIVB) Medicine Congress in Slovenia on January 2011 discussing several medical issues regarding the sports. Those studies described the epidemiology of volleyball related injuries retrospectively in adolescent high school girls, several European junior

national teams, and prospectively in adult female national and professional teams. Nevertheless, most studies on the subject of volleyball injuries involve either adult male or female athletes. Thus, information on volleyball related injuries in the young adolescent player is lacking.

The main objectives of the research is to describe volleyball related injuries in young athletes in Puerto Rico. The research also include identification of injury patterns and possible risk factors unique to the population of Puerto Rico. From the research outcomes, it was found that volleyball related injuries occur in all levels of plays. Young female players present with a higher number of volleyball injuries compared to young boys. Weight and BMI are factors associated with an increase number of injured boys, but other factors that may play a role in injury risk are age, female gender, height, front row position, contact with another player or floor, and game exposure on boys.

Reviews 17: Injuries among Volleyball Players: a Comprehensive Survey of the Literature (Filippo Migliorin, Björn Rath, & Markus Tingart, 2019)

There were many research regarding the injuries of volleyball players. The main key of the research is to systematically reviews, analyse, and and summarize current literature in order to obtain an extensive overview, and improve the evidences concerning injury patterns in volleyball players. The methods employed is a comprehensive review of the literature from all the relevant papers published in the past. The databases used were Pub-Med, Medline, CINAHL, Cochrane, Embase and Google Scholar. Articles in English, French, Spanish, Italian, and German were considered in the reviewed. The outcomes of the research focused on injury place, type of injury, circumstance, and injury severity.

The Newcastle–Ottawa Scale was employed for quality assessment on the data collected. The results showed that a total of 28,889 patients were enrolled. The mean age was 22 years and the mean follow-up 24.9 months. There were seven retrospective cohort studies and 16 prospective cohort studies. The mean injury rate was 4.21/1000 playing hours. The quality assessment resulted in moderate level. The lower limb was the most affected area, followed by the upper limb, trunk, and the head. Regarding lower limb, the most commonly injured area was the ankle, followed by the knee. Joint injuries were the most frequent, mostly represented by sprains and ligament damages. Spiking and blocking represented the most frequent circumstances correlated with these injuries. Acute onset lesions were more frequent than those caused by overuse. About a third of the injuries entailed a short-term absence from the field. In conclusion, the volleyball is commonly considered to be a safe sport, the overall probability of sustaining an injury is comparable with previous reports from other high-contact team sport.

Reviews 18: The Most Common Injuries in Volleyball and the Strategies to Prevent Them (Nurja, 2020)

It is no doubt that volleyball is known for benefit in health because the game involves heavy movement of the humans' physical part, but on the other hand it is also associated with a risk for injuries on both acute and overused. The strategies to reduce or prevent the occurrence of acute and overuse injuries are very important in the volleyball sport because it decrease the loss-time in competitions. The main research in the paper is to identify, which are the most common volleyball injuries and the strategies that support the prevention of damages in this sport. Researches are selected through Scopus, PubMed, Google scholar and Web of Science. There are included articles from different countries focused on injuries in volleyball. There are many injuries occur in volleyball but most of the researches considering in this study evaluates ankles sprain as the most common injuries in volleyball. Even though the other injuries are not so much left behind. An important approach to prevent all injuries in amount of 40% in doing an appropriate warm-up and considering it as an important part of the training session. The information in the research contributes to trainers, researchers and coaches who want to make a prevention program addressing to the most common injuries in volleyball in order to reduce the number of incidents in this sport.

From the research outcomes, Ankle sprain seems to be as the common injury in many researches and can result as time lost from volleyball. Injuries in competition are more likelihood to happen compare to those in training session or practices. The information providing in the research may be quite useful in contributing to prevention efforts. Woman's volleyball is more prone to experience injuries compare to man's volleyball.

Reviews 19: Injuries and Preventive Actions in Swedish Volleyball (Sofia Ryman Augustsson, Jesper Augustsson, Roland Thomee, & Ulla Svantesson, 2007)

The volleyball teams can come from various countries. Swedish also has its own volleyball team. The research was to examine the prevalence of injury and the extent of preventive actions in elite Swedish volleyball players. Injuries to players in the elite male and female Swedish division, during the year 2002-2003 season were registered by using a questionnaire. The results obtained were 158 volleyball players (70% response rate), a total of 82 players (52%) reported 121 injuries, during a total exposure time of 24 632 h, representing an overall incidence of 0.77 injuries per player. The majority of the injuries were located in the ankle (23%), followed by the knee (18%) and the back (15%). Most injuries (62%) were classified as being of minor severity. Most injuries occurred during training (47%), and 41% of the injuries had a gradual onset. Fifty-four percent of the injuries that could be related to a specific court situation occurred during blocking, and 30% during spiking. Most players (96%) participated in injury prevention training of some kind, generally performed without supervision (58%). Although most players took part in some kind of preventive action, one out of two

players incurred an injury during the season, which indicates that the risk of suffering an injury in elite volleyball is relatively high.

Reviews 20: Risk Factors for Volleyball-Related Shoulder Pain and Dysfunction (Jonathan C Reese, Elizabeth A Joy, & Christina A Porucznik, 2010)

Risk often happens to the volleyball player. There are many ways can predicts the risks happen when come to play the volleyball. The research identify the risk factors for volleyball-related shoulder pain and dysfunction. The research was conducted through the questionnaire distributions or survey among the volleyball athletes in the sport centre. A total of 422 athletes returned questionnaires, of whom 276 also underwent a structured physical examination. Study participants provided information on any history of volleyball-related shoulder pain or dysfunction. The simple shoulder test (SST) and a visual analogue scale permitted subjects to quantify the extent of their perceived functional limitation. Standard statistical methods of comparison and tests of association were used to identify risk factors for shoulder pain among participating volleyball athletes. The results showed that approximately 60% of participants reported a history of shoulder problems. Attackers and "jump" servers were more likely to have shoulder problems than setters, defensive specialists, and "float" servers. Nearly half of the athletes who reported shoulder problems perceived some associated functional limitation, with female athletes providing lower SST scores than male athletes (9.0 versus 10.1, $P = .001$). Athletes reporting shoulder pain and dysfunction were more likely to have SICK scapula scores of 3 or greater ($P = .010$). Participants who demonstrated core instability also had greater SICK scapula scores (3.9 versus 2.9, $P = .038$), and were more likely to report a history of shoulder problems ($\chi^2 = 8.83$, $P = .032$). Although most risk factors for volleyball-related shoulder problems are similar to those identified for other overhead sports, there appear to be additional volleyball-specific risk factors that may reflect the biomechanical demands of the sport.

Reviews 21: Influence of Stress and Anxiety on Sports Injuries in Athletes (Sajjan Pal, Sheetal Kalra, & Supriya Awasthi, 2021)

An athlete does not only require to be fit physically but also requires to be fit psychologically for their successful performance in sports activities. Hence, it is essential to understand the psychological risk factors which contribute to sport injuries in athletes. The research provide literature search in the international databases of PubMed, MEDLINE and Google Scholar was done by using following keywords: 'sports injury', 'stress', 'anxiety', 'athletic injury', 'psychology', 'predictors' and 'athletes'. The research shows the published papers from 1992 to March 2020 and in the English language were included in this review. The results showed that of 120 articles obtained by the end of this search process, 18 full text articles were finally selected. Most of the study designs were cross-sectional studies or surveys, cohort studies and descriptive studies. The overall results indicated that stress and anxiety are two notable psychological variables which are associated with predicting injury in different sports and found to be significant with the incidence of sports injuries among athletes of different sports. It was found that stress and anxiety can influence the risk of injuries, injury frequency, and injury severity in athletes.

Reviews 22: Psychological Issues in Sport Injury Rehabilitation: Current Knowledge and Practice (Dan Wagman & Maher Khelifa, 1996)

It is important to addressing psychological issues in athletic injury rehabilitation. This has been recognized by the medical community. When and how to address psychological ramifications of injury, however, have not been given sufficient attention. In current sports, there are various factors cause the athletic injury. To address the psychological responses on the injury, the models of adjustment to athletic injury, a 10-point assessment inventory, and some techniques were employed by sport psychologists discussed in the research. The main research is to outline specific guidelines to follow when assessing athletes and counselling them following athletic injuries. By implementing these guidelines, the athletic trainer can establish trust and rapport, become familiar with the athlete's perception of the injury, and attempt to get the athlete to commit to treatment. Often, athletes are treated for their physical complaints without giving attention to their psychological needs. These techniques can be used for athletes who have suffered an injury so that they may return safely both physically and psychologically to competition.

Reviews 23: The Psychological Parameters of Athletic Injuries in Female Collegiate Athletes (Courtenay Stewart-Reiner, 2020)

The research was to find out whether there was difference in the psychological parameters of life stress and anxiety as risk factors to injury. The research used survey method where there were 51 female athletes involved in the survey. The survey collected the data from various sport teams (basketball, golf, soccer, and softball) at the Division I college. The outcomes of the research showed that injured athletes experienced more life stress than non-injured athletes and this difference was statistically significant. It was also showed that non-injured athletes have lower anxiety compared to injure athletes.

Reviews 24: Psychological Resilience in Young Female Athletes (Kimberly H. McManama O'Brien, Miriam Rowan, Kyra Willoughby, & Kelsey Griffith, 2021)

Psychological resilience is an important to enhance athletic performance and foster valuable life skills. Through positive adaptation to adversity and stressors in the athletic arena, athletes are able to cultivate their ability to effectively respond to negative stimuli, ultimately evolving to personal growth. For young female athletes, development of resilience may be particularly important. Young female athletes face distinct challenges in sport including sport inequity, body image issues, eating disorders, increased mental distress, and internalization of emotions. The aim of the research is to define and describe the construct of resilience and discuss the implications and applications relevant to young female athletes. By understanding how to foster resilience strategies in this population, people can enhance sport performance and enjoyment, as well as bolster valuable life skills that facilitate personal growth.

In conclusion, young female athletes may present with specific vulnerabilities including disordered eating, body dissatisfaction, anxiety, and depression, among others. These challenges warrant a closer look at how to develop and enhance resilience, the positive adaptation to adversity and stress coping ability, in this population. Further study of individual level characteristics and behaviours predictive of resilience would enable the development of targeted interventions to mitigate the effects of sport-related stressors and support the health, wellness, development, athletic, and other life aspirations of young female athletes.

Reviews 25: Physiological and Psychological Changes at the End of the Soccer Season in Elite Female Athletes (Jose Morales, Vicenç Roman, & Alexandre Yáñez, 2019)

The research compares and describes relationships among stress-recovery indices, the heart rate variability index, and the Cooper and Yo-Yo IR1 tests among female soccer players during the last six weeks of the competitive season. Sixteen female soccer players engaged in a pre-test of all of the variables. After having their training monitored for six weeks, a post-test was administered. The results revealed significant ($p < 0.05$) differences in the specific stress-recovery scales of the RESTQ-sport and in the frequency-domain variables of the HRV, although there were no significant differences in the general stress or general recovery scales. The Yo-Yo IR1 test, the Cooper test scores, and the means of the time-domain HRV variables did not exhibit any significant differences between the pre- and the post-test. The RMSSD variations exhibited very large and large correlations with the performance test and the RESTQ-sport variables, respectively. The variations in the HRV frequency-domain variables exhibited significant moderate and large correlations among the variations of the RESTQ-sport scales.

Reviews 26: Current Concepts in Sports Injury Rehabilitation (Himmat Dhillon, Sidak Dhillon, & Mandeep S Dhillon, 2017)

The rehabilitation after injury in the sport activities become important for medical and sport specialist. The research aims to show differences injuries in the sports and then discuss the medical center is needed to heal the injured athletes immediately. The modern sport medical center can be established inside the sport center so that the injured athletes can quickly healed without travel to far distance. Rehabilitation should be done immediately, and the psychologist should be available to give advice to the injured athletes. This can help the injured athletes recover very fast and encourage them return back to the sport.

Reviews 27: Sport Injuries in Students - Athletes (G. Dyakova, P. Angelova, & Iv. Angelova, 2017)

An inquiry with students from Trakia University, Stara Zagora is carried out in the research. The main objective of the study is to determine the current state of sports injuries in student sports. The method to conduct the research is via a survey on the students' athletes in the sports injuries. Questionnaire method, alternative analysis and graphic analysis were employed in the research. The survey was conducted in 2017. The overall results showed that some of the methods and means of treatment and prevention are not well-known to students-athletes. The survey results make it necessary to seek and implement academic practice methods and tools to facilitate the recognition of sports injuries and upgrading of skills for the protection of their own health.

Reviews 28: Research on the Causes of Sports Injuries and Rehabilitation in University Physical Training (Wei Liu & Bowei Ma, 2018)

The main research is to study the causes of sports injuries and the effect of sports rehabilitation on university physical training. The method used was using questionnaires and interviews. There were 720 students and 25 teachers with a history of sports injuries were selected to investigate the causes of students' sports injuries. Then, 20 volunteers were selected as research subjects. They received a rehabilitation training protocol three times a week for six weeks. The results showed that sports injury is an inevitable problem during college physical training. Training joint flexibility and stability can effectively improve the surface EMG signals in the area adjacent to the joint to improve muscle strength and joint amplitude level. In summary, students should consciously undertake rehabilitation training under professional guidance and receive full instruction in sports rehabilitation procedures involving a combination of physical and psychological recovery.

Reviews 29: Restoration of Confidence and Perception of Coaches Following Sports Injury (Ricardo de la Vega, Roberto Ruiz Barquín, & Enrique Aguayo, 2017)

The cognitive response is important component in the psychological recovery from athletic injury. The research study the changes in psychological readiness to return to the sport among injured athletes. The research was conducted through the survey using questionnaire. The results had showed that athletes' confidence was lower immediately after suffering the injury and increased significantly before practice and competition. Athletes' perceptions of confidence before and after competition did not significantly differ from perceptions of their coaches. The finding also showed that coaches were aware of the confidence levels of athletes recovering from injury.

Reviews 30: Types and Frequency of the Injuries and their Preventive Treatment in some Combat Sports (Aleksandra Stanek, Arkadiusz Berwecki, & Paulina Stanek, 2017)

Combat sports and martial arts are in the first group of risk for sport injuries due to the direct contact of the opponents. The research study was to estimate the specificity and the frequency of injuries in some combat sports: boxing, judo, jujitsu, and karate. From the research outcomes, it was found that the groups prone to injuries the most were judokas and karate athletes. However, the boxers were found to be the most resistant to injuries. There are specific injuries with the highest frequency in the area of the arm and foot experienced by boxing, judo, jujitsu and karate athletes. Respondents who did not use any medical treatment after the injury recovered fastest; injuries appeared to renew among sportsmen who underwent medical treatment earlier.

3. Research Finding

From all the reviews, it can summarized that the variables used by the researchers to study the psychological stressors toward cognitive recovery of injured athletes are anxious, stress, loss of confidence, disordered eating, body dissatisfaction, depression, and social isolation. All these variables happen to the injured athletes after recovery or during injured. From the reviews, it is also notice that the injure athletes require more psychological curing compare to the physical curing of the injury. There were reviews proposed injuries model to guide the professional medical to cure the injure athletes. Also, from the finding, it is found that female requires more psychological curing compare to male. For the types of injuries in the sports, there were varieties and depends on the types of sports. The most common injuries are knee injuries, muscle pain, fracture, back pain, leg pain, ankle sprain, and hamstring pain. Table 1 summarize and explain the important variables found in the research of psychological stressors toward cognitive recovery of injured athletes.

Table: 1 Summary of the variables in literature reviews related to the psychological stressors toward cognitive recovery of injured athletes

Variables of literature reviews related to psychological stressors toward cognitive recovery of injured athletes	Meaning
Anxiety	Worry about the injuries cause the performance of the sport drops and affect the rest of the life.
Loss of confidence	No believe to continue in sports and live for the rest of the life if the injury is serious.
Stress	Unsolved problems become worry because no solutions can be found.
Depression	Feeling sad and useless.
Social isolation	Avoid mixing or joining with social life. The life will be independent.
Mood change	Changing from positive mood to negative mood. No optimistic in reaction and performance.
Loss of emotion control	Becomes more anger types and sensitive to things people talking and doing.

In terms of methodology, most of the reviews perform the survey by distributing the questionnaire in a niche places. The sample size was range from 50 to 300 and more. The results obtained were then analyzed using normal statistics. The normal statistics will be standard deviation, mean, frequency, and percentage. There were also researches using t-test to verify the hypothesis. The P-value also used to find out the significant of the study. In summary as an athlete, he or she has to prevent the injuries during the sport. Once the injuries happen, they may not easily to recover. The small injuries can recover fast and will not affect the performance of the athletes in the sport. If the big injuries happen, it cannot recover

physically but they will change the life of the athletes. This is why there is a need of psychologists and sport medical center supports for all kinds of physical sports (Neil Heron & Nikolaos Malliaropoulos, 2012), (Ivan Waddington, 1996), (Chris Bleakley & Domhnall Macauley, 2002), and (João Paulo Sousa, Jan Cabri, & Marie Donaghy, 2007). Further readings about the psychological stressors toward cognitive recovery of injured athletes can be found in table 2. Note that, that information collected in table 2 is a minor relationship to the psychological stressors toward cognitive recovery of injured athletes. The focus in table 2 is the finding of the variables. The one with 30 reviews mentioned earlier are the strong relationship information related to the psychological stressors toward cognitive recovery of injured athletes.

Table: 2 Further information related to psychological stressors toward cognitive recovery of injured athletes and the important of the research variables

Authors	Titles	Method	Finding of variables used in the Research
Yang S, Cheng S, and Su D	Sports injury and stressor-related disorder in competitive athletes: A systematic review and a new framework (Yang S, Cheng S, & Su D, 2022)	Reviews other articles	traumatic stress disorder
Roberts G, Arnold R, and Turner J	A longitudinal examination of military veterans' invictus games stress experiences (Roberts G, Arnold R, & Turner J, 2019)	Using questionnaire to collect the data	stress
Putukian M	The psychological response to injury and illness (Putukian M, 2020)	Using questionnaire to collect the data	Student-athlete mental wellness
Baranoff J and Appaneal R	When disaster hits: Helping the injured athlete to accept and refocus (Baranoff J & Appaneal R, 2019)	psychological skills training such as imagery, self-talk and relaxation training, and an emphasis is placed on changing the athlete's cognitions to influence emotional and behavioural rehabilitation outcomes	Acceptance and Commitment Therapy (ACT) matrix

4. Conclusion

The articles review consists of two parts. One is the psychological stressors toward the injured athletes and second part is the types of injuries. There were also rehabilitations reviewed. The overall reviews showed that most of the researchers conducted the survey to the injured athletes and use the statistical methods to analyze stressors affect the athletes' life after recovery from the injuries. The reviews also extract the variables from the articles and summarized them into a table for quick references. With the variables, it will be easy proceed to develop the research model related to the psychological stressors toward cognitive recovery of injured athletes.

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